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(54) **BINOCULAR TO HAT ATTACHMENT**

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(57) **ABSTRACT**

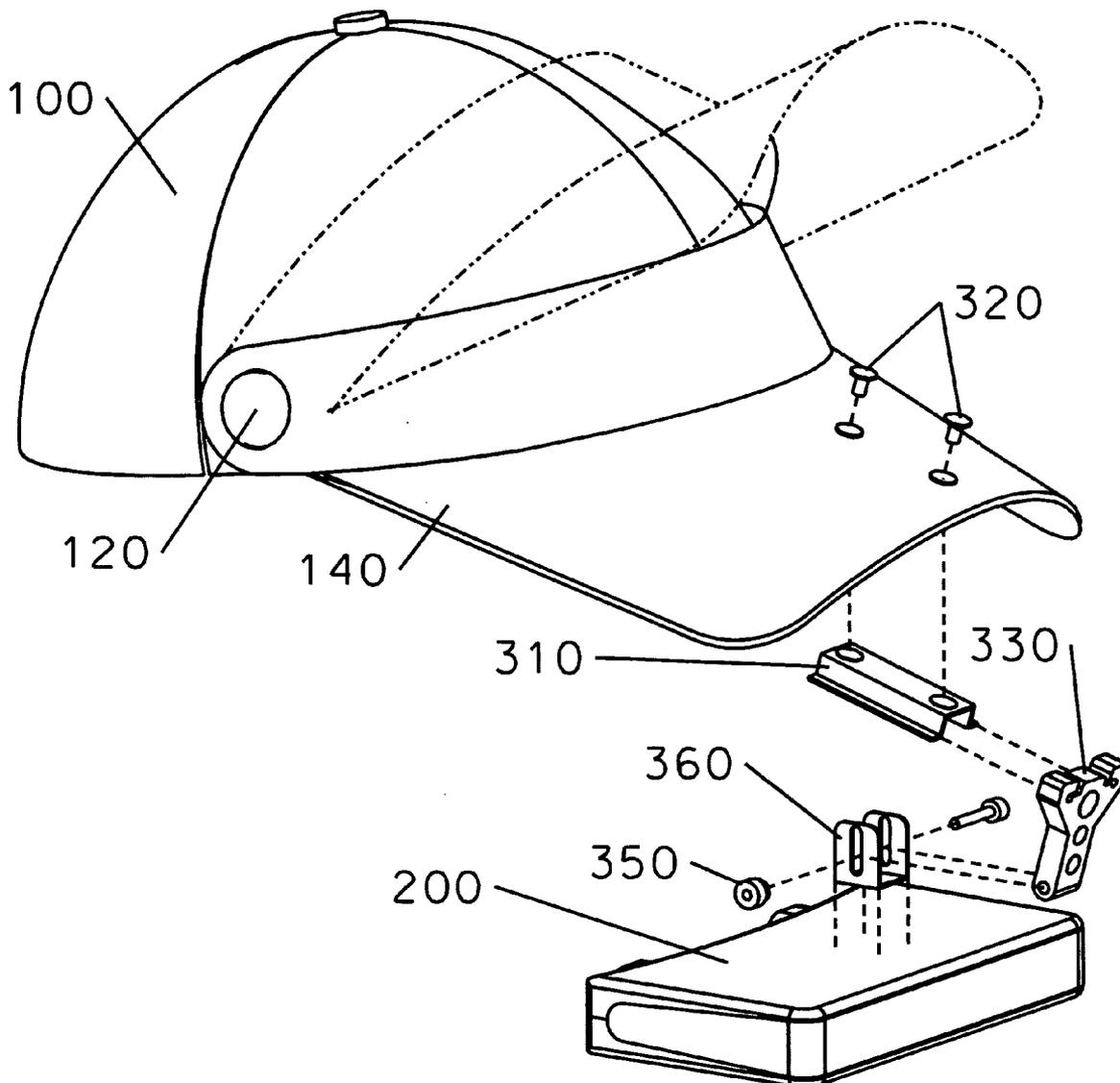
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A Quick and easy attachment system for linking a light weight headgear and a binocular for steady hands free viewing without fatigue. The headgear functions as an attractive hat or cap with visor and is comfortable for continuous use with or without the binocular attached. The attaching system offers multiple embodiments, functions and adjustments for differing conditions and wearers. Options include, flip up or fixed visor.



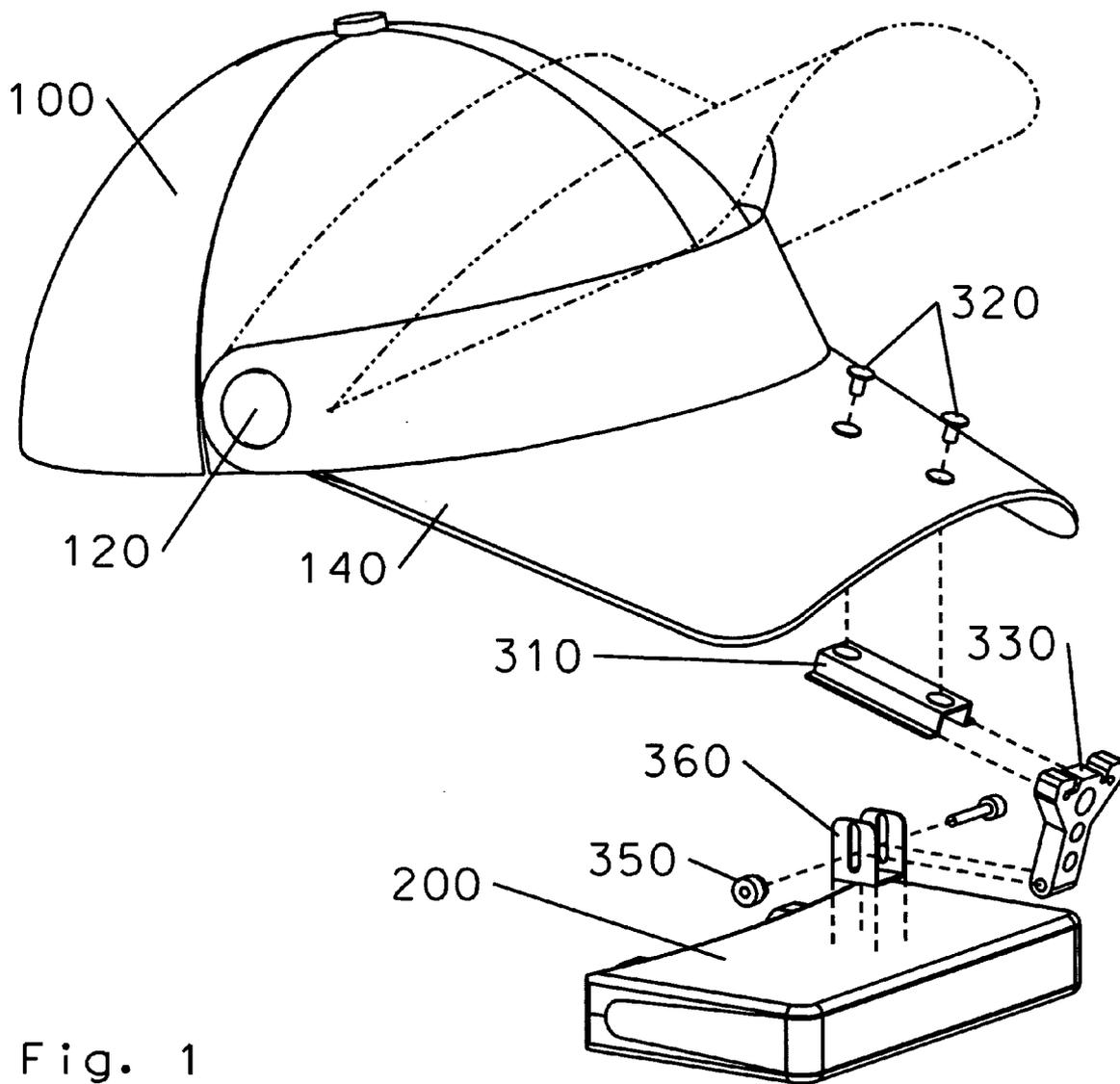


Fig. 1

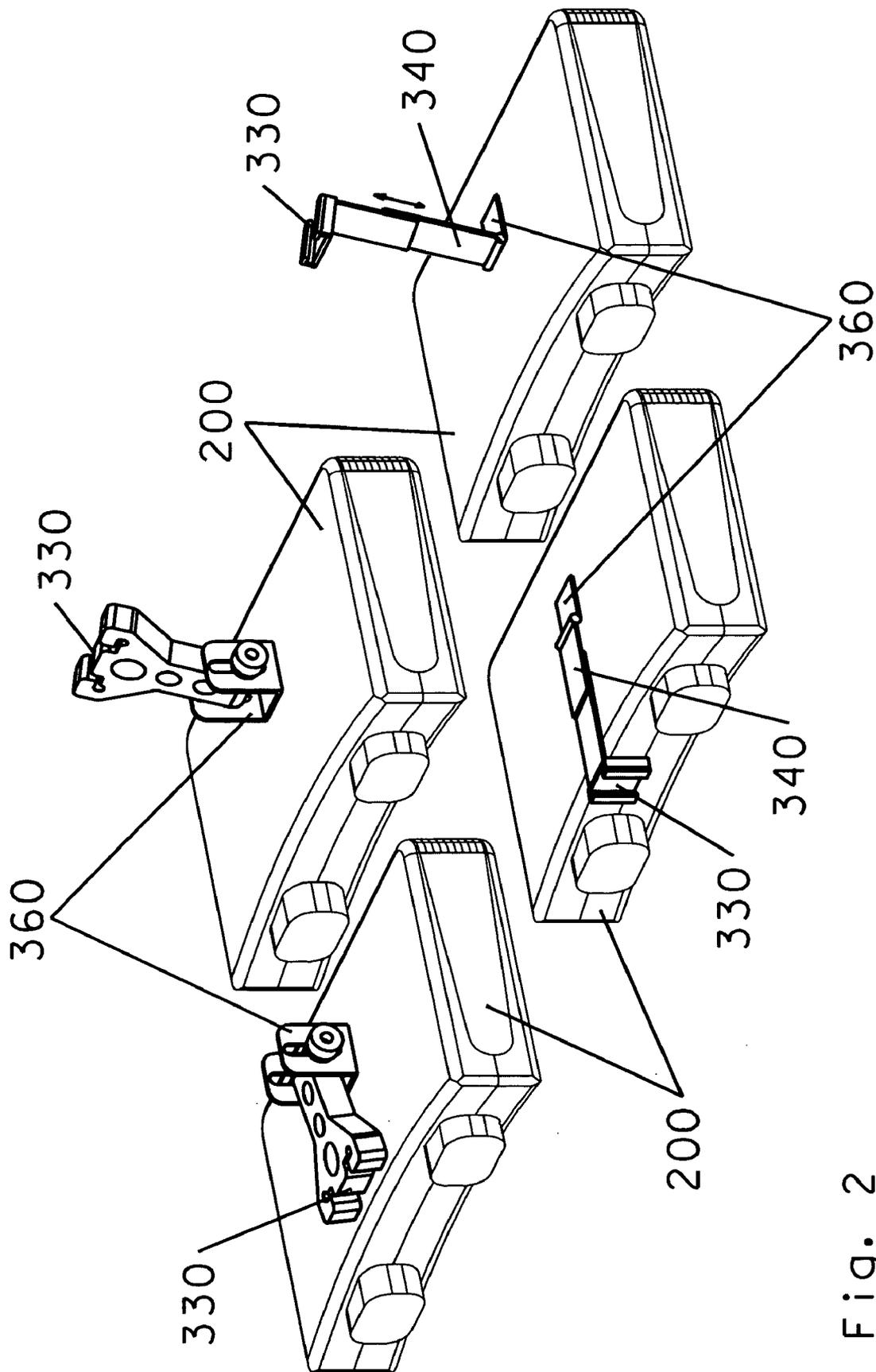


Fig. 2

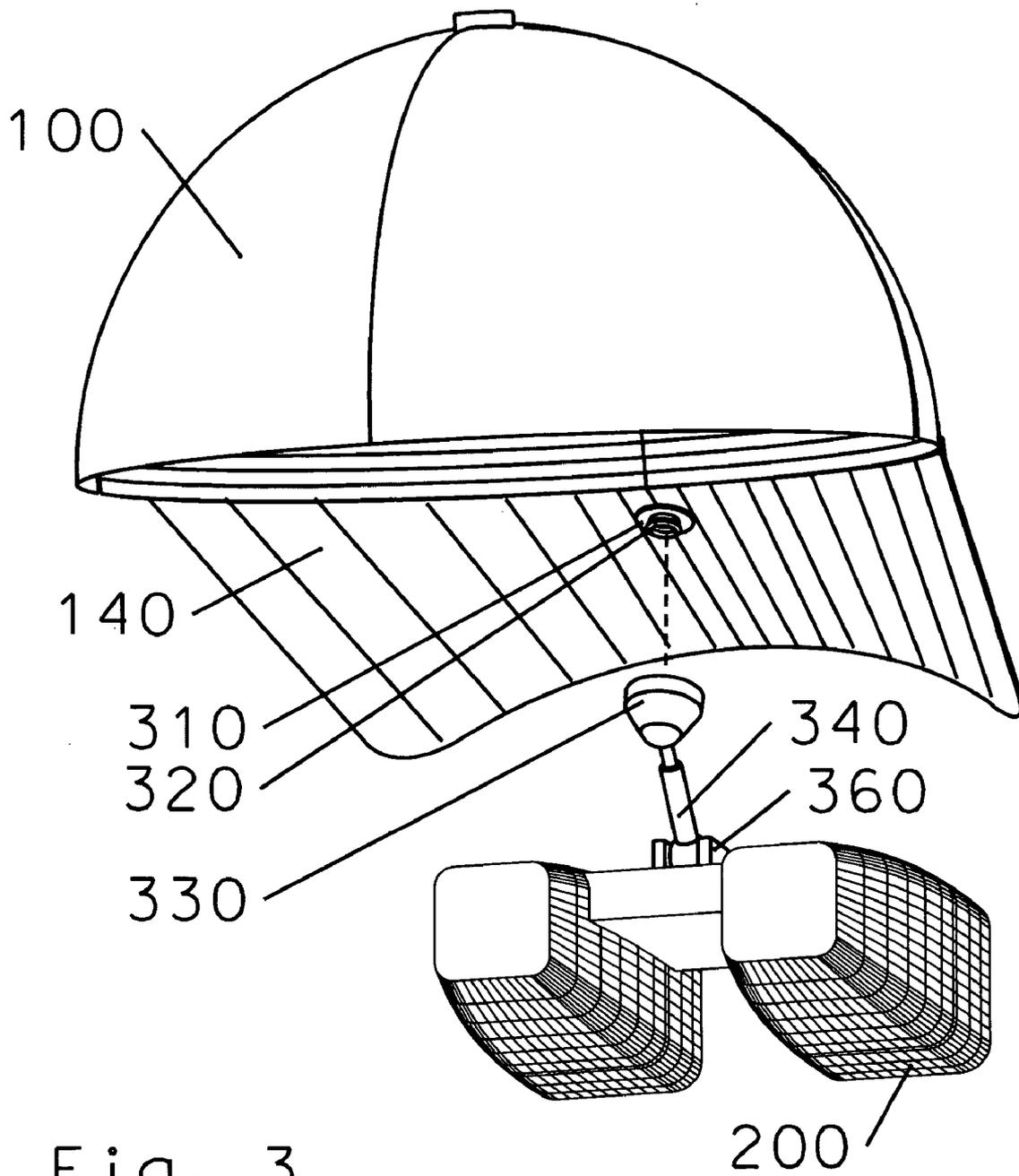


Fig. 3

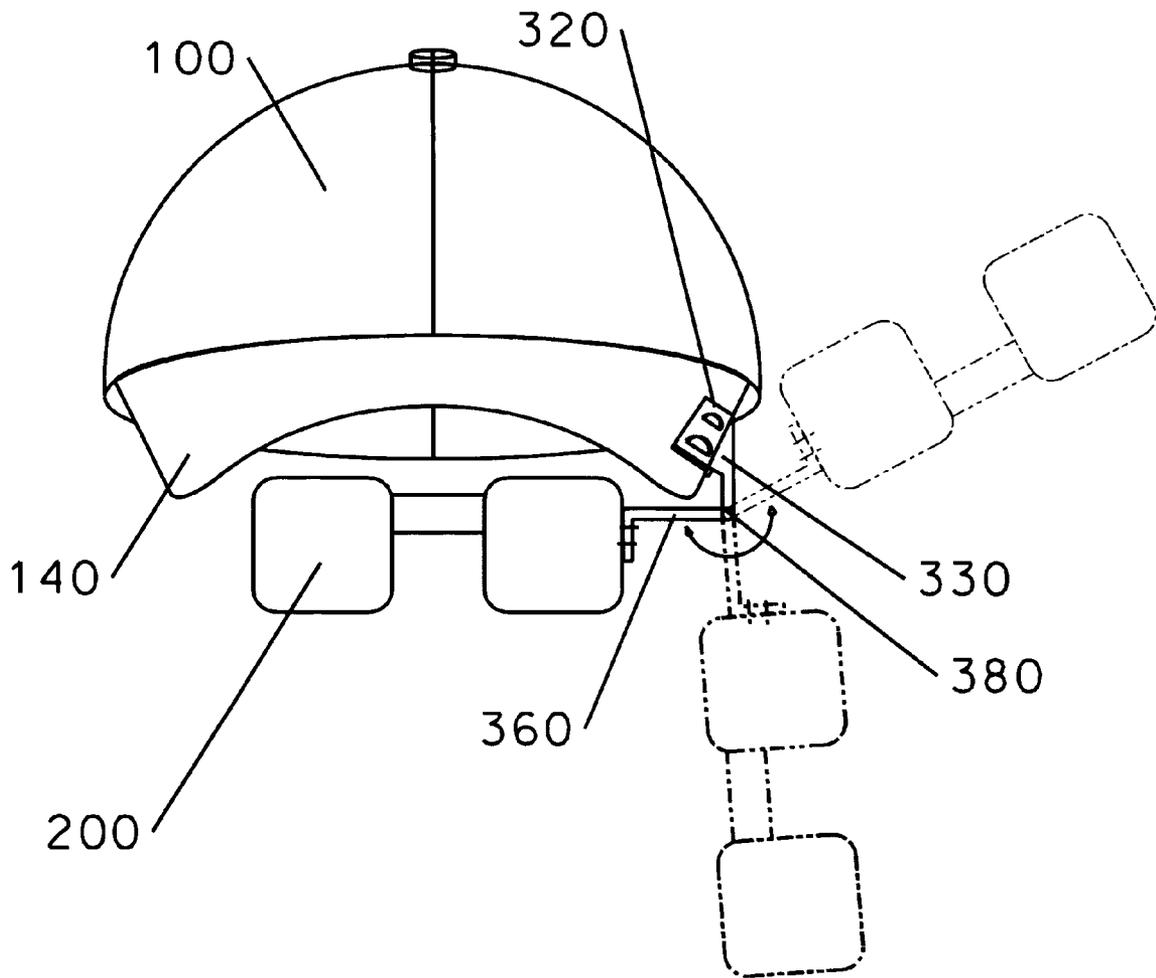


Fig. 4

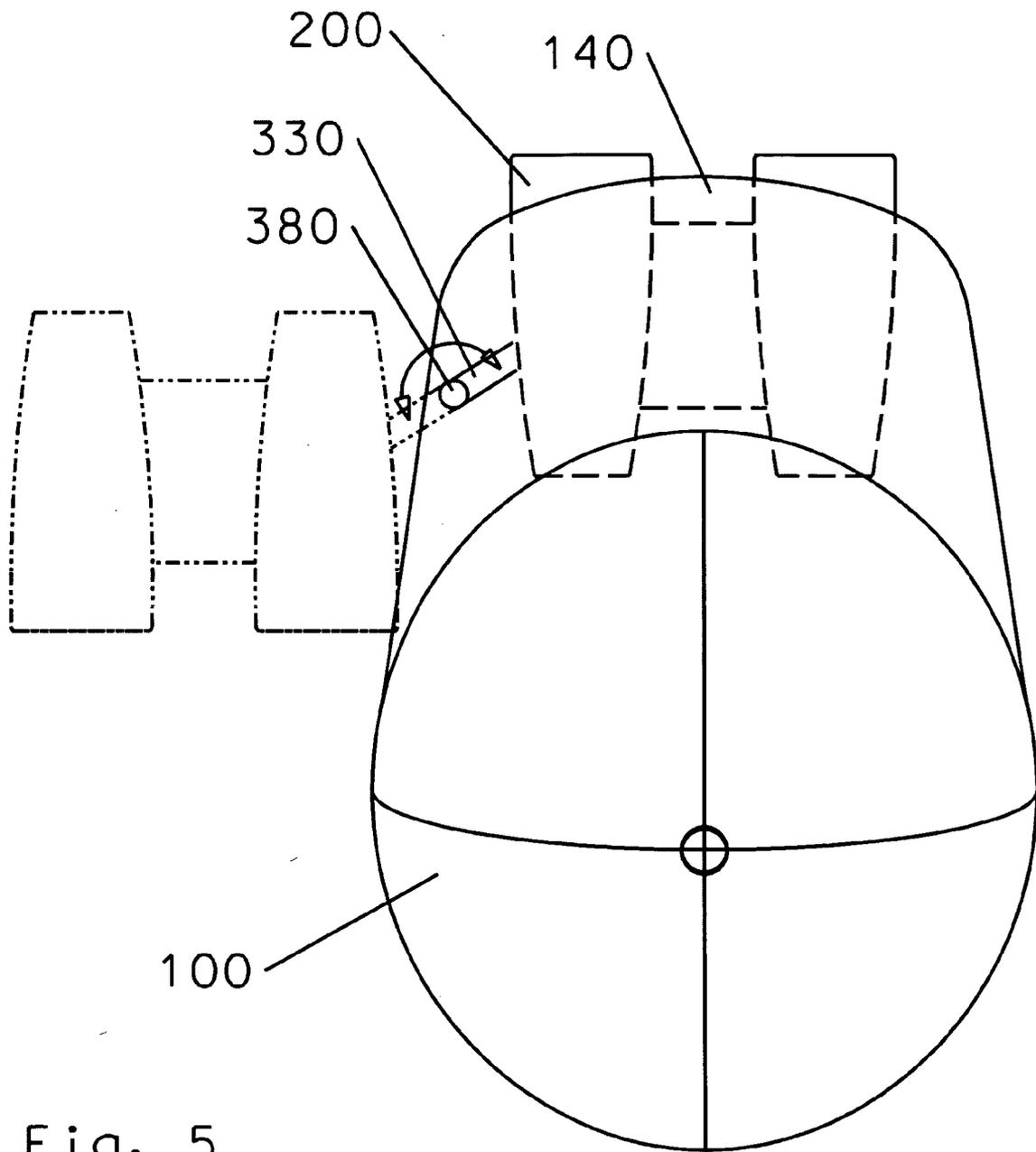


Fig. 5

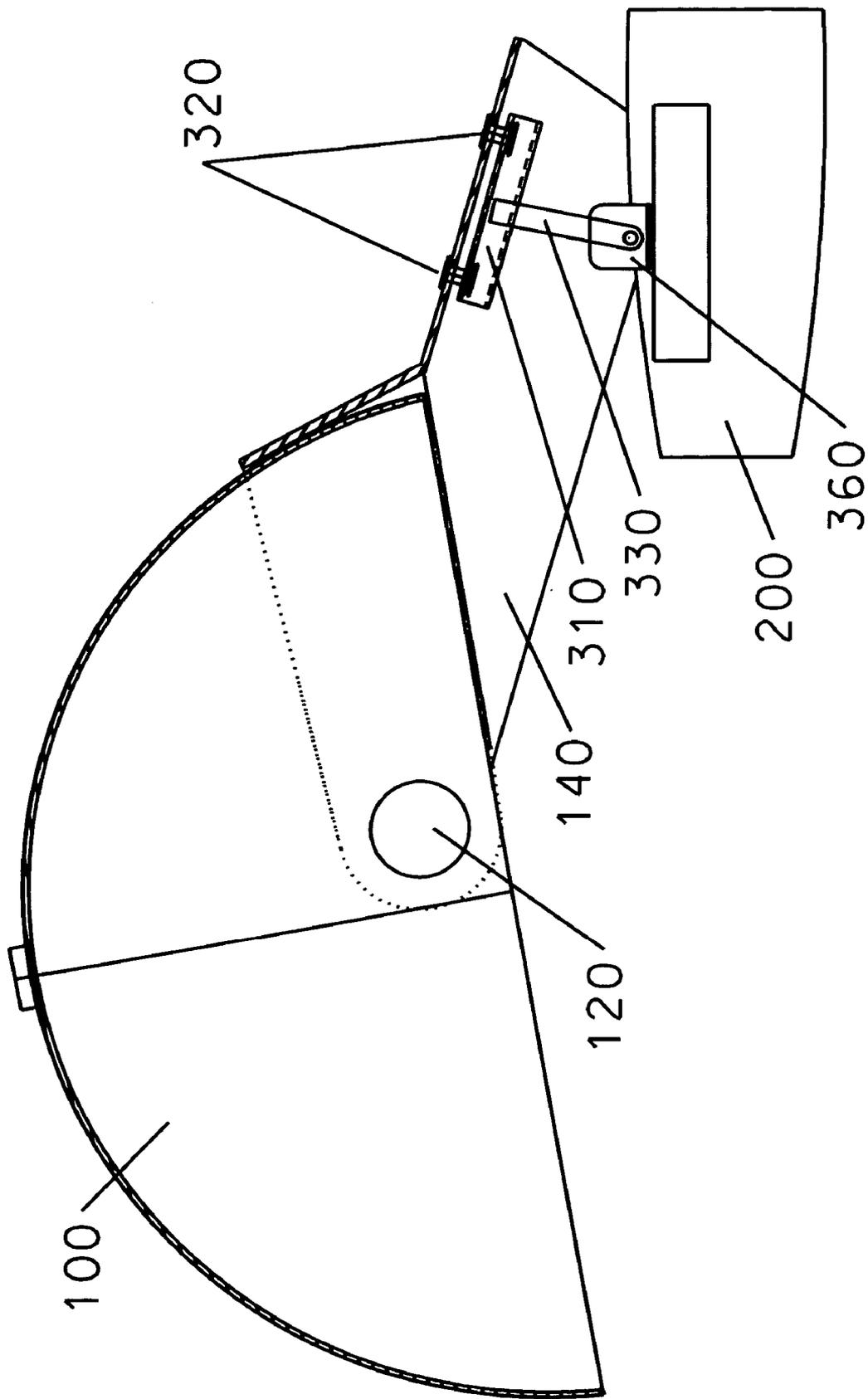


Fig. 6

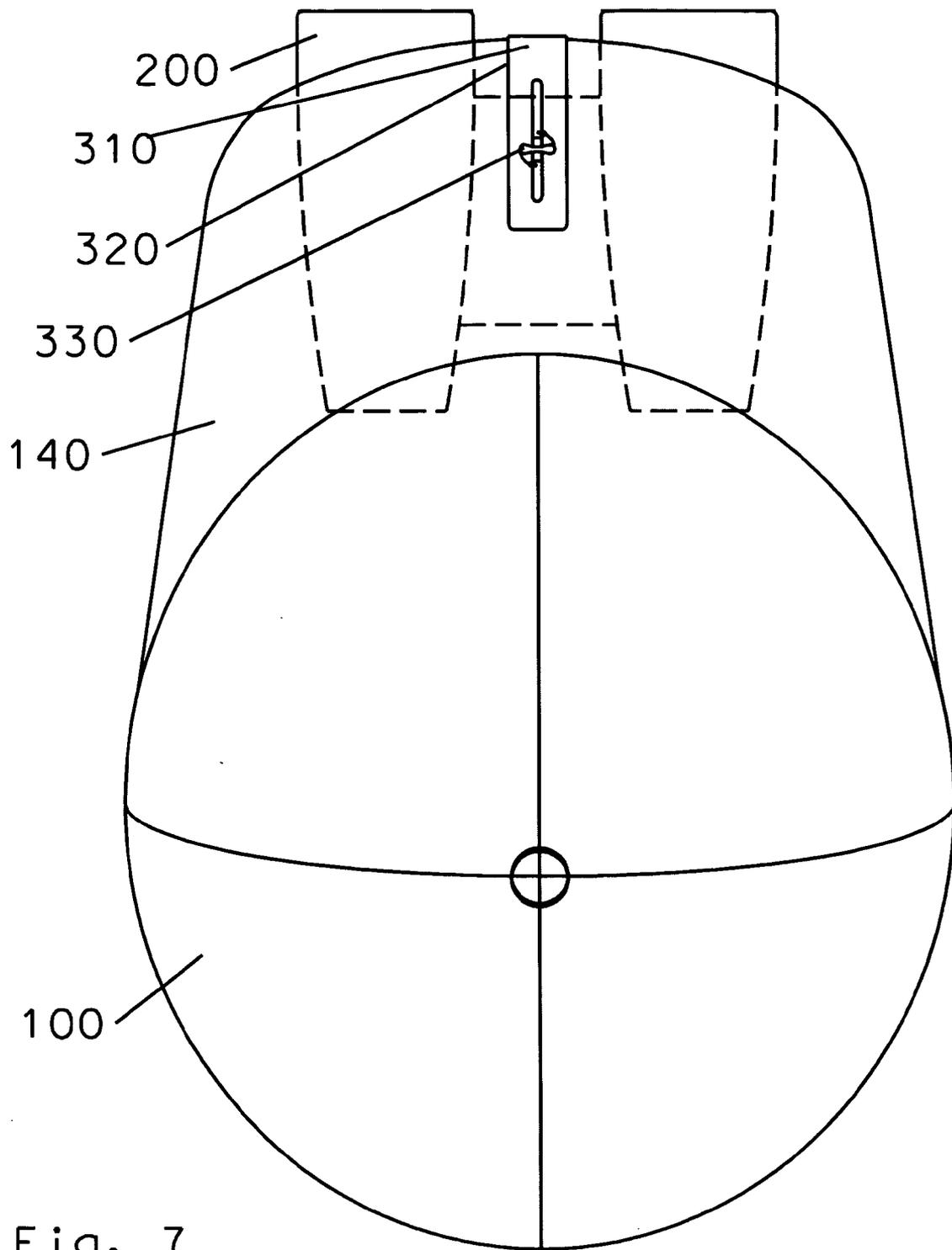


Fig. 7

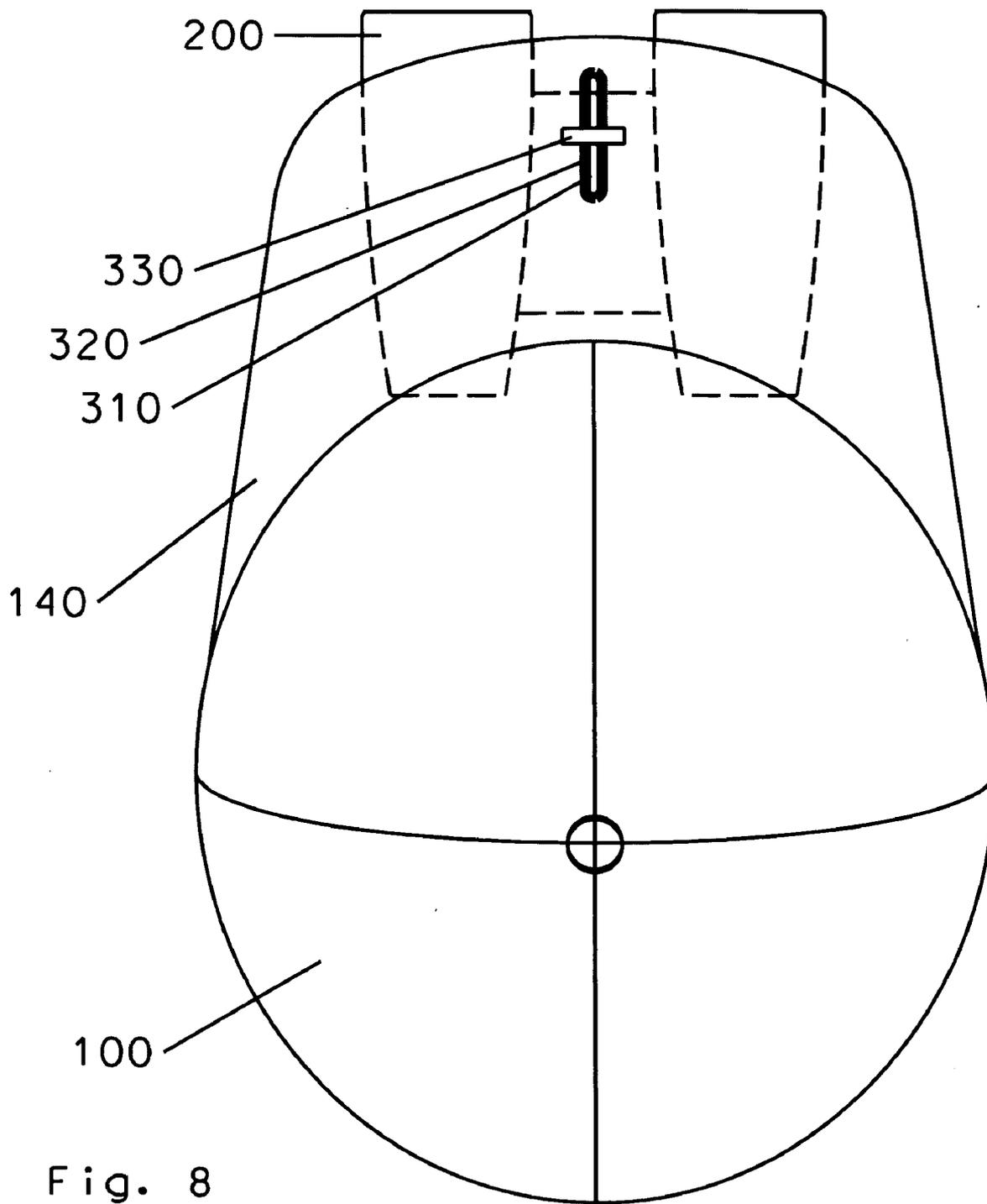


Fig. 8

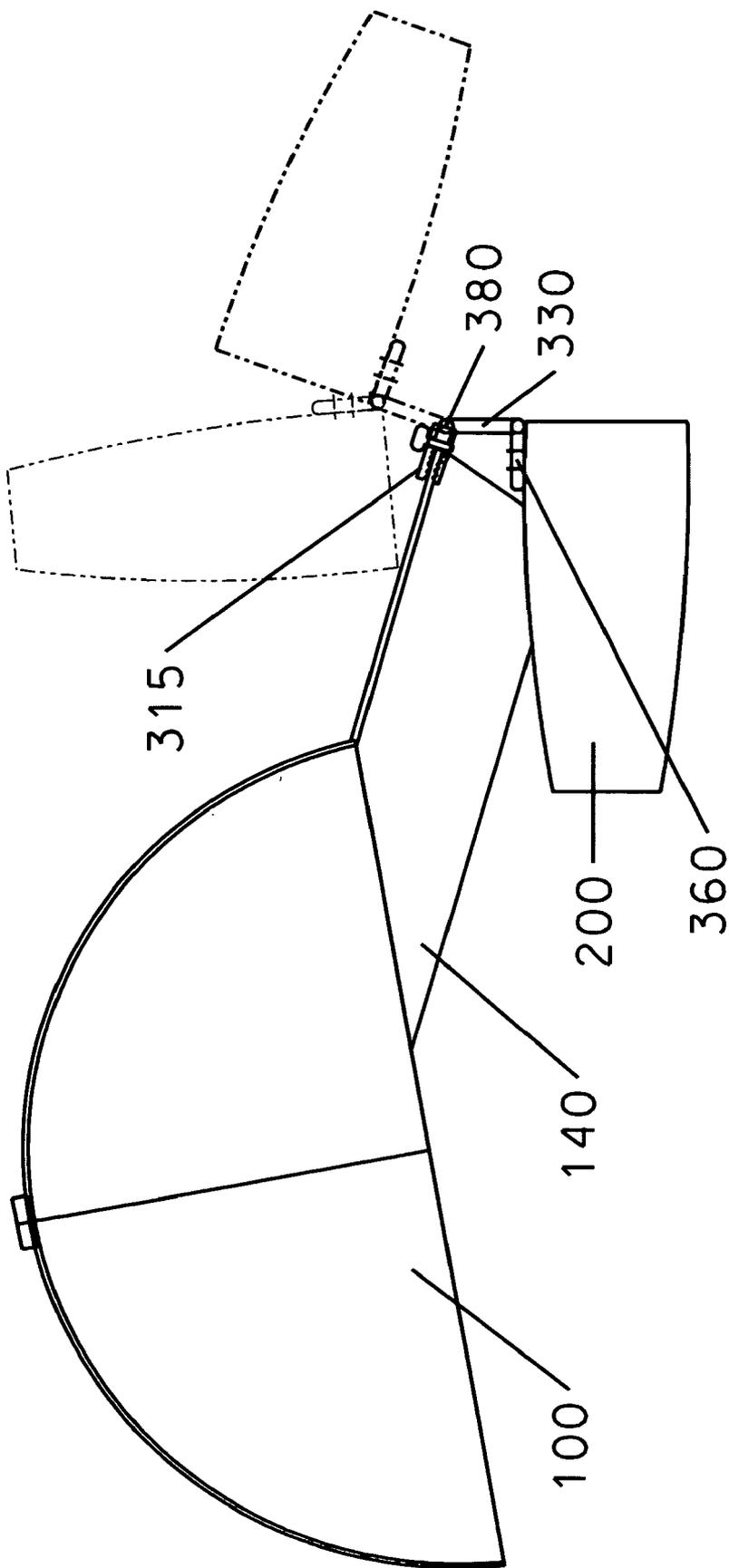


Fig. 9

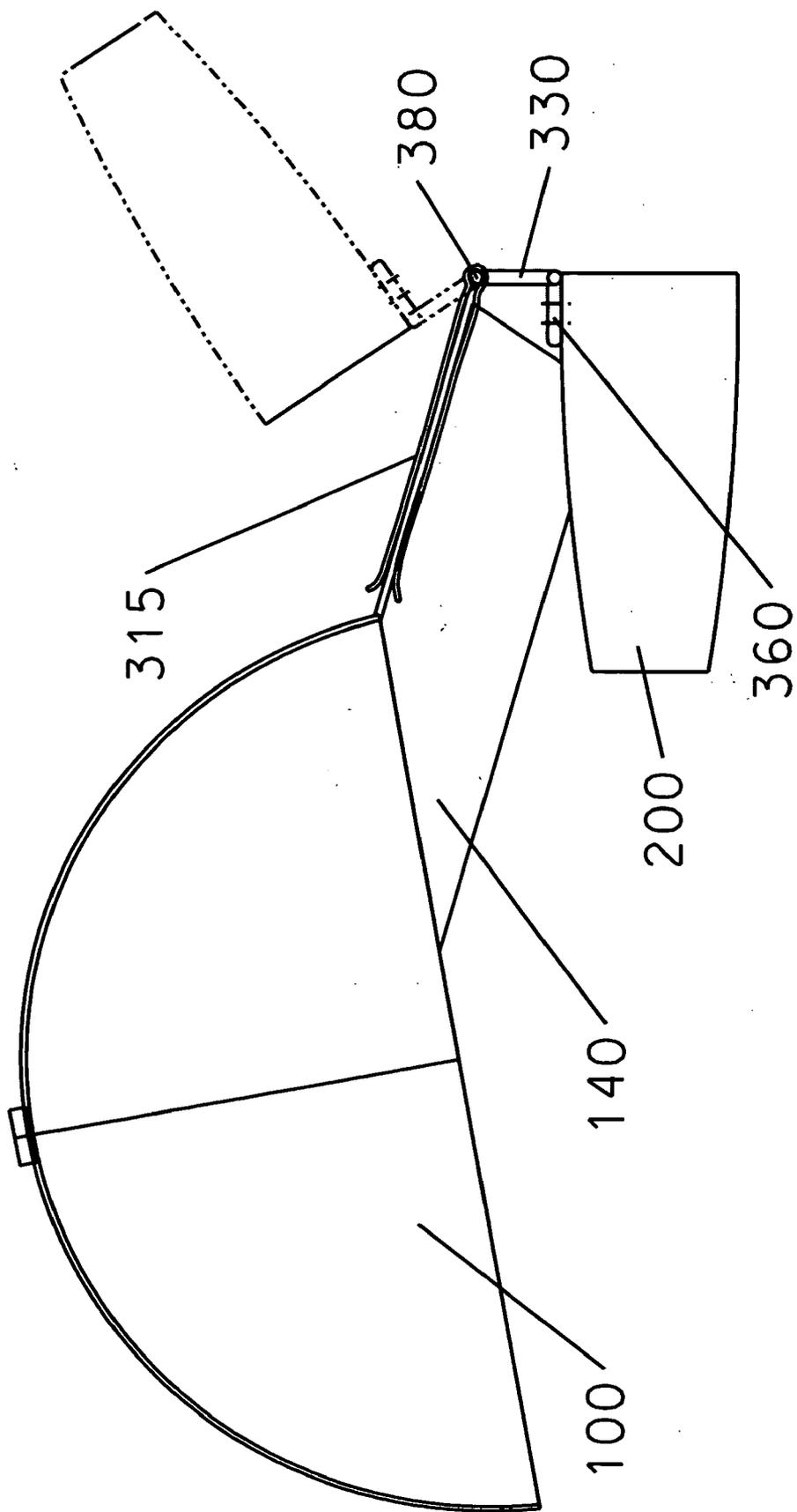


Fig. 10

## BINOCULAR TO HAT ATTACHMENT

### FIELD OF THE INVENTION

[0001] The invention relates to improved method and means for head mounting binoculars used for magnifying distant objects.

### BACKGROUND

[0002] Binoculars are commonly used for sporting events, concerts, bird and animal watching, surveillance, and scenery viewing. There are many models that are compact and lightweight enough to easily be carried in a pocket in typical clothing. Hand-held binoculars have the disadvantage of amplifying the tremors of the hands so the magnified view appears to shake. Long-term use of binoculars is fatiguing to the arms, and demands that one or both hands are not available for other tasks. A tripod may be used to steady a binocular from hand tremors, and offer hands free operation without fatigue, but is expensive, bulky, and far less portable.

[0003] There is a wide variety of headgear in the marketplace having various embodiments of visor, bill, brim, screen, shade, or other projections extending from the forehead of the wearer, extending outward above the eyes for a distance of a few inches. The purpose of the projections is generally to protect the eyes and face from glaring light, rain, or falling or blowing contaminants. Hats and caps of many types are commonly worn as decorative apparel apart from their protective functions; many display logos, advertising, slogans, and other attributes of stylistic value to the individual wearing the headgear.

[0004] Other types of headgear with projections over the eyes are for enhancing vision, such as the affixation of optical lenses to a visor like projection for jewelry repair, or other close work, they are not in conformance with headgear worn as apparel.

[0005] There are patents describing head mounted vision enhancement for military use, they offer the advantage of hands-free use, and are more stable than hand-held vision enhancement devices. These vision systems are complex and costly. They require bulky and/or heavy framework, and do not cosmetically blend in a civilian environment.

[0006] There have been attempts to head mount binoculars to headgear for sports viewing such as U.S. Pat. Nos. 6,369,958 and 6,614,603 issued to Himmele. The Himmele patents disclose a flip-up visor with binocular and radio devices attached. U.S. Pat. No. 6,115,846 to Truesdale combines a cooling fan, a binocular with adjustable flip-up mount, and radio to headgear. The Himmele and Truesdale devices are useful for sporting events, they offer steady hands-free viewing, yet they are not suitable for continuous wearing in public since they look much different than headgear typically worn. The devices are bulky to carry when not being worn, and they have a limited range of adjustment. There are numerous head mounted radio devices in the market, so combining a radio device with the headgear adds to the cost, weight and bulk of the device, and contributes to the non-standard appearance. The combinations of a fan in the Truesdale device further contributes to bulk and a non-standard appearance. The Himmele and Truesdale combinations do not have structures that allow for quick and easy detachment and reattachment of the binocular device.

[0007] U.S. Pat. No. 6,028,710 to Jensen discloses a clip type device to secure a typical binocular to a visor, and/or bill of a hat or cap. The device is not adjustable, and it offers no means to temporarily swing the binocular out of the field of view while keeping the binocular affixed to the headgear.

[0008] U.S. Pat. No. 5,526,178 to Goldstein et al discloses a binocular system of lenses removably mounted to a hat like headgear. The complex binocular is not suited for hand held use apart from the headgear. The optics have features unnecessary for the mass market; for instance costly lens options for military applications that filter out laser light. The attachment lacks means for an adjustment range needed to meet the special needs of a wide variety of users and situations; for instance there is no means for adjusting the tilt of the binocular relative to the headgear.

[0009] There is a need for method and means of head mounting a binocular to headgear that is quickly and easily attachable, and having the basic appearance and convenience of headgear typically worn in public.

### SUMMARY OF THE INVENTION

[0010] The present invention combines the advantages of the prior art while removing objectionable limitations. The first object of the invention is that the headgear be cosmetically similar to hats and caps commonly seen in public, having the same style and appearance of current trends in headgear. Another object that the present invention offers the ability to quickly attach, remove, and re-attach the binocular to the headgear; so the headgear may be worn at any or all times, while the binocular is carried separately and conveniently in ones pocket or purse. Yet another major object is to offer optional features such as a flip-up/pivoting cap bill, hat brim or open top visor that enables wearer to momentarily remove binocular from field of view while retaining any other preset adjustments. Yet another object is the ability to use the binocular as a normal hand-held unit. So in non engineering terms, one would leave home with this purpose built cap for an outing, the same as with a conventional ball cap, wearing it all day if so desired. Then at anytime be able to attach this compact binocular with its full adjustability that is easily carried in a pants pocket. And the whole cap interface and binocular could be appropriate for and simple enough to be used by everyone including children, at baseball, football, NASCAR events, etc.

[0011] Other objectives are low cost, light weight and ease of manufacture. Additional objects and advantages of the invention will be apparent to those versed in the arts after reading the detailed specifications to follow.

[0012] It will be appreciated by those versed in the art that there are many embodiments encompassed by the present invention. For instance there is wide variety of styles for headgear; therefore the cosmetically and physically attributes of the invention will differ, but all variations will share the elements taught by the present invention in the descriptions to follow.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is an exploded perspective view of one preferred embodiment.

[0014] FIG. 2 shows two different connection linkages in folded and deployed conditions.

[0015] FIG. 3 is a view of an embodiment of the invention from the perspective of the user.

[0016] FIG. 4 is a front view showing the range of motion of an embodiment.

[0017] FIG. 5 is a top view showing the range of motion of an embodiment.

[0018] FIG. 6 is a side sectional view.

[0019] FIG. 7 is a top view showing one method of attachment.

[0020] FIG. 8 is a top view showing another method of attachment.

[0021] FIG. 9 is a side view showing range of motion.

[0022] FIG. 10 is a side view showing range of motion.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

##### The Headgear 100:

[0023] There are many other styles of headgear 100 that may be used within the scope of the invention. The headgear apparel style that is prevalently used includes, but is not limited to: baseball style caps 100, cowboy hats, visors, straw hats, safari hats, etc. It is a requirement of the headgear 100 to provide structure to support the weight of a small binocular 200, and have an adjustable or fixed headband secure enough to prevent slipping off of the wearers head during normal activities of observing common events while a binocular 200 is attached. Further required is a projection from the front of the hat 140 to support the binocular 200 such as a bill 140, visor 140, brim 140, rim 140, or shade 140. The visor 140 or bill 140 may be fixed, or equipped with a pivot 120 with friction, positive locking or detent type positioning methods, as with a welding helmet or clear grinding type face shield, to flip up to a position higher on the head with the binocular attached or detached enabling rapid removal from normal view and rapid return to magnified viewing while retaining other preset adjustments on the interface 300. The baseball type of headgear 100 is best for use as the headgear for the preferred embodiment from several perspectives: it is the type in widest use, it has a bill 140 or visor that extends over the eyes that may support the weight of a small binocular 200; most baseball type caps 100 have a size adjustment means, and the cap 100 and bill 140 can be modified to flip up without drastically changing the appearance from that of a common baseball cap. The baseball style is depicted in the drawings, however it will be a pairant to those versed in the art that the teaching of the invention may be applied to any other appropriate style of hat. Optional functions of the headgear 100 include but are not limited to: a flip-up visor 140 capable of supporting the weight of a compact binocular 200 in either the up or the down position; a means of cooling like vents, fan, endothermic devices or evaporative surfaces.

##### The Binocular 200:

[0024] There are several types of binoculars 200 that are commonly used to magnify the visibility of distant objects. Types that are commonly available include but are not limited to: super wide field of view types, roof prism designs, internal mirror designs, zoom and simple lens

types. In addition it is anticipated that electronic binoculars 200 that use a video camera with electronic display will come to be in common use in the future. It is desirable that the binocular 200 used in the present invention be compact and lightweight to minimize structural support requirements of the headgear 100; and the weight and bulk that must be born by the wearer. Including purpose built units designed specifically for the intended purpose of interfacing with ball cap 100, visor type head gear 100.

##### The Detachable Interface 300:

[0025] The preferred embodiment of the interface consists of two basic connection components, the first component 310 temporarily or permanently affixed to the headgear interface component (with fastening means 320) to accept and interface with a second component 330 temporarily or permanently affixed to a binocular interface component. Yet the said interface 330 could be easily detachable from both the hat and binocular and carried separately. The attachment interface 330320310 components are lightweight, compact and adaptable to a range of different binocular and headgear types that are commonly available or purpose built and could be fitted to ones existing head gear as a special service provided or as a self installed kit. The requirements of the hat 100, binocular 200 and interface 300 components are: including but not limited to, light weight, low cost, ease of manufacture, and inconspicuous and non-interfering with the operation of both the headgear and the binocular when used separately or together.

[0026] There are many ways of affixing the interface component 300series to the headgear 100, including but not limited to: Threaded fasteners, adhesives, rivets, press-fit, draw latch, hook and loop (VELCRO), spring loaded clips, elastic band, crimped, welded, magnets, button in fabric button hole, tie laces, zip tie strapping, twisted wire, buckle, and/or any other appropriate method known to those versed in the arts, separately or in combination. There are many ways of affixing the interface component 300series to the binocular 200, including but not limited to: Dove tail slide, threaded fasteners, adhesives, rivets, press-fit, draw latch, hook and loop (VELCRO), spring loaded clips, press pins, elastic band, crimped, welded, magnets, button in fabric button hole, tie laces, snaps, zip tie strapping, twisted wire, buckle, and/or any other appropriate method known to those versed in the arts, separately or in combination.

[0027] There are many ways that the interface component 300series interfaces with the binocular 200, and hat 100; the relative merits of the different ways selected according to: the intended use, the quality desired, the desired style of the headgear 100, and the optional functions offered.

[0028] Some of the connection structures 330 include but are not limited to: pivot pins, telescopic struts, elongated slot with pin, repeatedly deformable link, ball joints, parallelogram strut, dovetail slide, friction fit slide, multiple detent slide or pivot, magnetically constrained slide. Quick attachment linkage 330 means and methods include but are not limited to: dovetail slot, hat section track mount, magnetic force, snap in place retention, t-slot, button and slot, spring tensioned clip, thumb screws, quarter turn fastener, Zeus type fastener, electrometric grommet with push-pin, push-button ball release, hook and loop,

[0029] Some methods and means of removing the binocular 200 from the field of view while maintaining attachment

include: rotating from field of view over the top of the hat brim **140**, **FIGS. 9 and 10**, side mounted to swivel out to one side **FIG. 5**, by locking type hinge a binocular **200** could rotate on an axis parallel or vertical to the bill or visor edge **FIG. 4**. The requirements of the attach method are: an adjustment range to accommodate different wearers normally expected preferences and physical constraints (the distance from the eyes, the angle to the head,) Some of the detachable mounting **330** methods include but are not limited to:

**[0030]** The headgear-binocular interface **360** is adjustable to vary the distance that the binocular is in, in relation to the wearers' eyes, the angle to the bill or visor **140**, and the distance of suspension below the bill or visor **140**; the means of adjustment **340** include but are not limited to: telescopic devices, sliding links, elongated slots with pin, and any other method known to those versed in the arts.

Alternative Embodiments:

**[0031]** An alternative embodiment is an interface **300** that is adaptable to any flip up or fixed bill **140** cap or hat, or any flip up or fixed visor, and any compact binocular that allows rapid, removable attachment to an ordinary hat, and combinations thereof. The pivot **120** may be incorporated into the headgear **100**, or the pivot **380** may be incorporated into the interface **300**series.

Operation:

**[0032]** The preferred embodiment of the present invention may be used as follows:

**[0033]** A sports fan going to an event will wear their favored style of headgear component **100**, for instance having baseball cap styling, with a flip-up visor. The wearer enjoys full use, style, and function of the headgear as a baseball cap **100** (or other style) when the binocular **200** is not attached. The wearer may conveniently carry the compact binocular **200** in a pocket, purse or on a neck or wrist strap. The binocular **200** is fully usable as a regular handheld binocular, and may comprise several popular styles or be purpose built specifically for this intended purpose. The binocular **200** has a fitting component **300**series that allows quick and secure attachment to an inconspicuous fitting **310** on the bill or visor **140** of the headgear **100**. In the preferred embodiment the user may focus and adjust the optics prior to, or after mounting to the headgear **100**. And all is simple enough and suitable for use by children.

**[0034]** Operation of the alternant embodiment is accomplished by pivoting the binocular out of the field of vision by using the hands to overcome the friction or detention force of the pivot **120/380** and swinging the binocular **200** out of the field of view when observation without magnification is desired for a period of time. When viewing with the binocular **200** is desired to resume, the user overcomes the friction or detent force to return the binocular to the position in front of the eyes.

**[0035]** A range of adjustment is needed to suit varied viewing conditions, personal preference, and physical constraints and differences in individuals. The range to accommodate pitch angles could usefully be as much as 45 degrees below and 30 degrees above the horizon. Additional adjustment range includes up to 1.5 inches fore and aft, and up to 1.5 inches vertical. The adjustment ranges are maximum

values and shall not be construed to limit scope of the invention to non-zero amounts less than the maximum.

1) A device of functional apparel for attaching a binocular to a hat or cap comprising:

a hat with a pivot or fixed visor or bill projecting out over the wearers eyes, and

a magnification binocular for viewing distant objects, and

an adjustable connection structure that allows fixed positioning of said binocular in relation to said hat within a range that allows comfortable viewing, and

an attachment linkage that allows said binocular to be quickly attached and/or detached from said visor or bill of said hat without the use of tools,

whereby steady and comfortable, hands free viewing; and whereby independent use of said hat and said binocular is quickly achieved without encumbrance, or unsightly appearance.

2) The device of claim 1 whereby said hat is selected from the group consisting of:

baseball caps, cowboy hats, straw hats, fedoras, fishing hats, Greek style fishing hat, fishing caps, pith helmets, safari hats, and visors.

3) The device of claim 1 whereby said binocular magnification means is selected from the group consisting of: super wide field of view types, roof prism designs, internal mirror designs, electronic display of video, zoom, and simple lens types.

4) The device of claim 1 whereby said adjustable connection structure is selected from the group consisting of: pivot pins, telescopic struts, elongated slot with pin, repeatedly deformable link, ball joints, parallelogram strut, dovetail slide, friction fit slide, multiple detent slide or pivot, and magnetically constrained slide.

5) The device of claim 1 whereby said quick attachment linkage is selected from the group consisting of: dovetail slot, hat section track mount, magnetic force, snap in place retention, t-slot, button and slot, spring tensioned clip, thumb screws, quarter turn fastener, Zeus type fastener, electrometric grommet with push-pin, push-button ball release, and hook and loop fastening.

6) The device of claim 1 further comprising a pivot linkage with an axis of rotation that allows said binocular to be quickly swung out of the field of view of one who wears said hat; whereby attachment to said hat is still maintained.

7) The device of claim 6 whereby said hat is selected from the group consisting of:

baseball caps, cowboy hats, straw hats, fedoras, fishing hats, Greek style fishing hat, fishing caps, pith helmets, safari hats, and visors.

8) The device of claim 6 whereby said binocular magnification means is selected from the group consisting of: super wide field of view types, roof prism designs, internal mirror designs, electronic display of video, zoom, and simple lens types.

9) The device of claim 6 whereby said adjustable connection structure is selected from the group consisting of: pivot pins, telescopic struts, elongated slot with pin, repeatedly deformable link, ball joints, parallelogram strut, dovetail slide, friction fit slide, multiple detent slide or pivot, and magnetically constrained slide.

**10)** The device of claim 6 whereby said quick attachment linkage is selected from the group consisting of: dovetail slot, hat section track mount, magnetic force, snap in place retention, t-slot, button and slot, spring tensioned clip, thumb screws, quarter turn fastener, electrometric grommet with push-pin, push-button ball release, and hook and loop fastening.

**11)** The device of claim 1 further comprising cooling means selected from the group consisting of: endothermic devices, and high surface area ratio evaporative cooling materials.

**12)** The device of claim 7 further comprising cooling means selected from the group consisting of: endothermic devices, and high surface area ratio evaporative cooling materials.

**13)** A method of attaching a binocular to a hat comprising:  
providing a head mounting means,  
providing a binocular view magnifying means,

providing a connection adjusting means

providing an attachment linking means,

whereby steady and comfortable, hands free viewing; and whereby independent use of said hat and said binocular is quickly achieved without encumbrance, or unsightly appearance.

**14)** The method of attaching a binocular to a hat of claim 13 further comprising providing a pivoting means with an axis of rotation that allows said binocular view magnifying means to be quickly swung out of the field of view of one wearing said hat; whereby attachment to said hat is still maintained.

**18)** The method of attaching a binocular to a hat of claim 13 further comprising providing a cooling means whereby the person wearing the hat is cooled in hot weather.

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